REMARKS

Claims 1-4, 7-8, 16-17,21,24-26,29-30,38 and 42 were rejected under 35 U.S.C 102(e) as being anticipated by Tumey et al. USPN 6,807,291.

In addition clams 5-6, 9-15, 18-20, 22-23, 27-28, 31-37, 39-41, and 43-44 were rejected under 35 U.S.C 103(a) as being anticipated over Tumey.

Applicant respectfully argues that the 102(e) and 103(a) rejections are incorrect for the following reasons.

Applicant's invention is targeted at solving a crippling problem demonstrated in the Tumey reference, as well as most other biometric devices – the requirement of large and expensive computing power built into the verification step of the process. Please note that the Tumey device requires (column 3 description) a computer 113 to be an integral part of the entertainment apparatus. The computer is required not only during the enrollment process (described in detail in columns 7 and 8), but also later in the verification process (described in column 9). The description in Tumey makes it clear that the computer 113 is constantly connected (via communications cable 119) and absolutely required in order to do verification.

Applicant's application, by contrast is aimed at eliminating the need for a computer as part of the verification process. This means that the actual biometric validation module represents a very small, low cost, low power module (the carrier) totally separated from a computer that does the initial (one-time) enrollment process. This is explained in paragraph [0023] in referring to figure 1:

> *[0023] It is important to note that module 160 comprising blocks 120,125, and 130 together represents a small, low power, low cost module that can be placed in a wide variety of applications to be described later. That module can have the neural net weights from enrollment computer 115 transferred into it before or after being embedded into a variety of the carriers to be described later.*

The novel value of this separation is further described in paragraphs [0030] and [0031].

> *[0030] It is important to understand that in use the verification step of the neural net does not involve analyzing a fingerprint template obtained from validation sensor 120. No biometric templates are prepared or stored as in much of the prior art. The data from validation sensor 120 is transmitted to the neural net structure of neural net circuitry 130, which generates a yes or no answer using the neural net weights previously downloaded from programmable computer 115. The logic algorithm built into neural net circuitry 130 is a set of multiplications and additions with no conditional branching and little intermediate memory storage. This aspect of the instant invention enables the use of a low cost, small size, low energy consumption circuit that can fit within the specifications of current ISO compliant financial and transaction and ID card designs. These benefits of the neural net circuitry would apply to other biometrics such as those obtained from microphones or cameras and thus could be voice, iris, retina, face, or hand print data and would apply if the carrier were a smart card or a keyless wireless entry device for example.*

> *[0031] A particular strength of the instant invention is that the computationally intense step in biometric authentication has now been moved completely to the enrollment process, and the enrollment process is normally only done once or at most a few times.*

The actual verification step, which will ordinarily be done many times, has been converted into a parallel processing computation that can be carried out in hard wired circuitry without a complex microprocessor required. In this way the initially stated goal of finding a small, low cost, low power required portable verification solution is achieved.

This critical distinction from any prior art approaches requiring extensive computing power is even more evident when examining claim 2 of the application which states that it is the neural net circuitry 130 mounted <u>on the carrier</u> that generates the acceptance signal -not a high powered PC computer. The concept of a carrier with a simple neural net circuit is not taught in Tumey.

Accordingly applicant offers to amend claim 1 to include the additional limitation of claim 2 to make this distinction clearer. The amended claim 1 is provided in this response.

Applicant respectfully argues therefore that Tumey is not an appropriate 102 reference because it requires a connected personal computer with a disk storage device. Applicant further argues that amended claim 1 is therefore novel and is non-obvious. Thus applicant requests that the rejections of claims 2-23 be withdrawn because they are dependent on the new valid claim 1.

With respect to independent claim 24 examiner states that Tumey discloses transferring a chosen set of neural net weights to a carrier in column 8 lines 23-43 but in fact Tumey never discloses that because in the Tumey description in lines 23-43 no neural net weights are ever transferred. There is no separate "carrier" in Tumey. The neural net information remains in the enrollment computer and all computations are done there. Applicant thus, as in claim 1 argues that Tumey is not a proper 102 reference and that claim 24 is therefore novel and is non-obvious because this inventive approach of transferring only a small set of neural net weights into a carrier based neural net circuitry has not been previously disclosed.

Applicant thus requests that the rejection of claim 24 be removed as well as the rejections to dependent claims 25-44.

As an additional point applicant would like to point out that in regard to claims 21-23, and 42-44 examiner has stated that Tumey teaches in Figure 3 a neural net that has both inter and intra layer connections of the nodes. Applicant respectfully argues that in fact Tumey limits his disclosure to a conventional neural net in which only inter-layer connections are used. This in fact is characteristic of all of the prior art of which the applicant is familiar. Figure 4 of this application and the discussion of that figure in paragraph [0040] is a preferred embodiment of this application and is thus claimed in these particular dependent claims. Note that in Figure 4 of this application each node in input layer 410 is connected not only to the nodes in hidden layer 420 but also to the nodes in hidden layer 430 and the single node in output layer 440. The increased interaction between nodes is evident. A neural net of the type of FIG. 3 is defined as an inter-layer connected net. A neural net of the type of FIG. 4 is defined as an inter and intra-layer connected net.

Applicant argues that with the above considerations and the amended claim 1 the application represents both novelty and non-obviousness and requests that the application be granted.

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